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Is Mexico the Emerging Leader of Latin America in Post-Carbon Politics?

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Abstract

Air pollution is a serious threat to the health and economic development of Latin America, where over 100 million people breathe dangerously polluted air. More than 14,700 deaths were caused by air pollution in 2010 in Mexico alone. Thus, the Mexican government has pledged to reduce CO_2 emissions by 30% by 2020. To reach this goal, the Mexican government has several options including: 1) a straight carbon tax, to remain in force; 2) a carbon tax evolving to a market-based cap-and-trade system; or 3) a carbon tax evolving to a market-based system, with resultant revenues dedicated to supporting clean energy initiatives. The argument is made that European Union countries and others have shown that a carbon tax can work, with certain safeguards in place, but it should transition to a market-based system over time, as this is favored by industry. In addition, to support long-term clean air goals and showcase ongoing successes, revenues should be used to support the development of renewable energy (RE), which can enroll citizens as stakeholders.

Option 3 has the potential to support emissions reduction goals, generate economic investment and jobs, and improve the population's health. Mexico has announced firm initiatives in this direction. Other Latin American countries are making progress. Brazil has expanded clean energy to 15% percent of its total, Chile plans to increase RE to 20% by 2020, and Uruguay is inviting solar and wind projects. But no other Latin American country appears to have a plan as comprehensive as that of Mexico. Its leadership and example could thus serve as a model for Latin America, if its government follows up on its promises.

1. Introduction

Mexico is the second most populous country in Latin America, with a population of 118.4 million as of 2013. Brazil is the largest country, with 203 million people. Mexico's nominal GDP was $1.26 trillion in 2013, and its GDP per capita was $10,310 in that year (The World Bank, 2014a). It has an EPI (Environmental Performance Index) score of 55.03 in 2014, ranked 65 out of 178 countries which is ahead of other Latin American countries with large urban populations such as Brazil (77) and Argentina (93) (Yale, 2014).

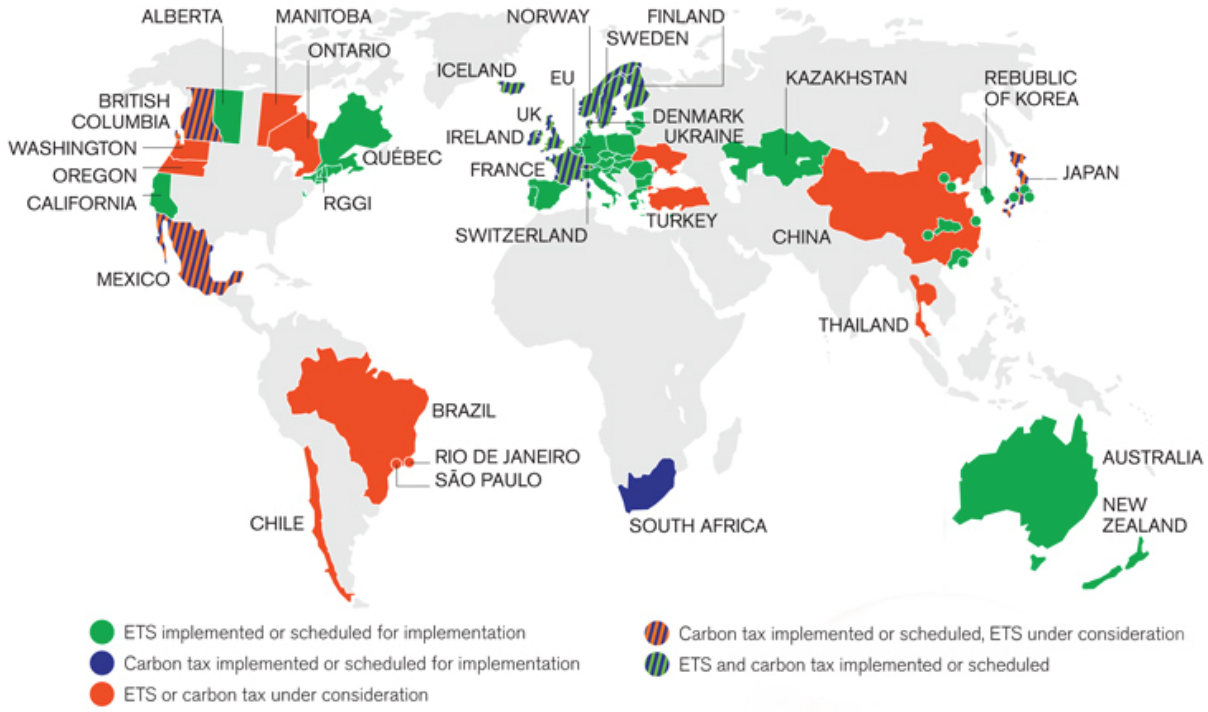
According to the World Bank, Mexico's GDP growth rate has been declining. It was 5.1% in 2010, but only 1.1% in 2013 (The World Bank, 2014b). As Mexico seeks to return to faster rates of economic growth, the pollution-prone exploitation and commercialization of its natural resources threaten its environmental sustainability. Costs of pollution were estimated at approximately 5% of GDP in 2011, primarily due to the impact of air pollution on health in Mexico. According to the World Health Organization, more than 14,700 deaths were caused by air pollution in 2010, and nine of Mexico's cities are among the 20 most polluted on the planet. Mexico is thus highly motivated to reduce air pollution, not just to reduce climate change (which was made a goal when Mexico signed and ratified the Kyoto Protocols) but to save thousands of its citizens lives (Richter, 2013).

The healthcare and related costs of pollution do not include the costs of government subsidies to the fossil fuel industry, which are not made public. However, fossil fuel subsidies are estimated to be many hundreds of millions of dollars annually (Makhijani, 2014).

In recent years, Mexico has taken major steps toward a greener economy. The current President of Mexico, Enrique Peña Nieto, has spoken about adopting the Inclusive Green Growth paradigm. He said, "The great promise of a better future for humanity is the ability to grow and create wealth without damaging our environment or our natural heritage" (RTCC, 2014). In

2014, it was a first-mover country in Latin America to implement a carbon tax and consider an Emission Trading Scheme (ETS) as shown in Figure 1 (World Bank, 2014c).

Figure 1. Map of Existing, Emerging, and Potential Regional, National and Sub-National ETS and Carbon Tax Pricing Instruments



Source: The World Bank, 2014

President Nieto believes it is possible to both tackle climate change and achieve economic growth, implying he believes the often-stated "either-or" dilemma between increasing economic growth and improving the environment is false. This paper defines sustainable development as a condition when climate stabilization policies trigger innovative solutions that drive economic growth and offer social benefits. The question then becomes: What viable options are there for achieving all three of these goals for Mexico, followed by other Latin American countries?

2. Literature Review

Many countries have tried various options to reduce air pollution and provide a rich source of experience of workable alternatives, as well as lessons learned about unintended consequences and their accompanying possible mitigating actions. Countries have tried simple carbon taxes, various types of cap-and-trade schemes that allow companies to gain credits by supporting the reduction of pollution outside of their immediate area, and investments in clean energy projects. Since government-imposed carbon taxes are much simpler to implement than cap-and-trade schemes that need free-market inputs, many countries have started with straight taxes and then transitioned to cap-and-trade.

The Secretariat of Environment and Natural Resources (Semarnat, 2014) introduced a carbon tax in Mexico in 2014 on the use of fossil fuels. The tax is, strictly speaking, not on total

carbon content, but on the additional amount of emissions that would be generated if the subject fossil fuel were used instead of natural gas. The tax on natural gas is, therefore, zero. The rate is capped at 3% of the sales price of the fuel (The World Bank, 2014d). This policy aims at increasing awareness of CO_2 emissions and encouraging the use of cleaner fuels and other green alternatives. The approximate carbon emissions price was set at \$3.50/tCO_2e (tons of carbon dioxide equivalents). The estimated revenue is roughly \$1 billion per year. This price is relatively low. The 2013 cost per tCO_2e in the European Union was about \$6.70, \$11.50 in California, and \$15.75 in the United Kingdom for fuels to generate electricity.

Many companies are using even higher prices, called internal carbon prices, to plan for future investment decisions. For example, Shell uses a price of \$40 per ton for projects with long lifetime, and it uses this number to plan budgets. Many companies anticipate that some governments may charge social costs of carbon in the future. The American government recently estimated the social cost at \$37 per ton (The Economist, 2013).

The Mexican government is considering additional policies to reduce pollution, including investment in clean energy research and development (R&D) and various market-based cap-and-trade mechanisms. Three such schemes are discussed below.

2.1 Carbon Taxation

A carbon tax is a tax levied on the carbon content of fossil fuels (e.g., coal, oil, and natural gas). It provides a carbon emissions price in the economic system. Carbon taxes are intended to control emissions by establishing a fixed price that polluters must pay. High prices discourage pollution.

The Nordic countries first announced carbon taxes in the 1990s. Denmark started its program in 1992. The Danish carbon tax's aim was to, "Increase the climate change profile and provide an economic incentive to consume less energy from carbon-intensive sources" (World Bank, 2014c). Although performance results have been mixed in other Nordic countries, Denmark showed a strong decline in energy use, 26% from 1990 to 2010 and a 25% decrease in CO_2 emissions from 1993 to 2000 (World Bank).

The Danish carbon tax covers all consumption of fossil fuels and was introduced gradually to minimize effects on the competitiveness of industry. It was presented as part of a larger environmental tax package that includes energy taxes and subsidies for green investments. Since the purpose was not to increase the overall tax burden, the energy tax was lowered to offset the introduction of the carbon tax. Norway implemented a similar tax in 1991, to include coal, oil, and natural gas. It was found that a few industries had to be exempted, to preserve competitive positions, but the tax covers more than half of the total Norwegian CO_2 emissions (World Bank, 2014c).

Switzerland also has a carbon tax. Companies are allowed to switch to a cap-and-trade system but not many companies have done so. The tax has enabled it to meet its Kyoto Protocol commitments. Proceeds from the tax are returned to citizens, in the form of discounts on health insurance and building renovations to make them "greener."

Two benefits of a "pure" carbon tax are that it is relatively simple to administer and it gives the state immediate revenue. In contrast, market-based systems can take years to define and implement. During a conference on the economics of carbon taxes at the American Enterprise Institute, Williams (2012) presented his research results on choosing among carbon mitigation policies, including carbon taxes, emissions trading, and traditional environmental policies (including clean energy standards, electricity emission taxes, efficiency policies, higher

motor fuel taxes, phased oil taxes, and tighter fuel economy standards). He found that a carbon tax has the least management costs per ton, with the highest relative emissions reduction.

Critics of a carbon tax, which may include powerful industries, have made accusations that it can make companies non-competitive and may force industries to leave the country and set up in untaxed locations (a consequence known as "leakage"). Fischer et al. (2012) provided options for mitigating adverse carbon tax impacts on manufacturing industries and examined partial or full exemption from carbon taxes, output based rebates (OBR), border carbon adjustment (BCA), and other options. They found border carbon adjustment to be an effective method of addressing leakage. An import-based BCA requires importers to pay a carbon tax equivalent to that of local production and can thus avoid the loss of exports.

Studies showed that other safety mechanisms should also be considered, including phasing in the tax slowly so industry can adapt to it, and meeting with industry to consider tax reductions or exemptions for any companies that would in fact become uncompetitive. Studies by the World Bank, the United Nations (UN), and others have shown that the impact on a country's GDP of a carbon tax that is carefully implemented is normally very minor (Bowen, 2011; Carolyn et al., 2012).

In general, it was found that a carbon tax shows promise in improving the environment, but other policies may have a more positive impact on economic growth, as well as social benefits in Mexico. In 2013, 14 countries had a fixed carbon tax. Prior to 2013, more countries had fixed taxation but transitioned over time to a market-based system (World Bank, 2014d).

2.2 Market-Based Systems

The World Bank's (2014c) *Report on the State and Trends of Carbon Pricing* follows the evolution of carbon pricing, and explains different instruments and approaches. Two common market-based mechanisms are the European Union Emission Trading System (EU ETS) and the Clean Development Mechanism (CDM). Both of these are commonly called an ETS or cap-and-trade program. They are managed by the governing jurisdiction that sets an emissions limit, the "cap," but leaves it to the negotiations of the market (i.e., the "trade") to set the price of the carbon. It was first used in the U.S., as a part of the Clean Air Act Amendments of 1990, to reduce dangerous levels of SO_2-caused acid rain resulting from coal-fired power plants.

This type of pollution reduction system provides permits for pollution, and a spot market to trade such permits. A cap-and-trade system generally has a set goal and schedule for the total amounts of carbon emissions across a wide area, but the price for a specific pollution source can remain flexible. It can thus reduce the economic impact that a pollution quota might have on a specific business, while ensuring that quotas are met at regional and international levels.

There may be circumstances where a totally free cap-and-trade system may be harmful. For instance, companies in Norway (where emission reduction tends to be expensive) could choose not to curtail their own pollution at all, but to simply buy carbon credits from far-away countries where pollution reduction is far cheaper; this could lead to excessive local carbon emissions. For such cases, and for occasions when there are wide swings in economic conditions (e.g., inflation and deflation), a floor (i.e., a minimum level) for local reductions may be beneficial.

Another problem with market-based systems was evinced by the EU ETS, established in 2005. The carbon price started at \$38/tCO_2e and remained fairly stable for a while, but then underwent a wild downswing as a result of the international economic crisis that started in 2008, which caused a supply-demand imbalance. The reduced emissions in the system due to less fossil

fuel usage led to an overly high supply of allowances and a carbon price drop of over 80%. The EU is now looking for long-term solutions to this problem. Its short-term measure to strengthen the ETS was to implement "back loading" of 900 million allowances, that is, to defer assessing payments due until the end of a significant time period. The EU Allowances system is an extremely complex financial infrastructure and has led companies to buy “futures” in credits in case their prices rise or they may not be available at certain periods.

The Clean Development Mechanism (CDM) works similar to the EU ETS. Generally, a polluting entity from a developed country can earn Certified Emission Reduction (CER) credits for investing in projects in a developing country, and each credit is equivalent to a ton of CO_2. CER credits are intended to count towards meeting Kyoto Protocol targets. As is the case for the EU ETS, CDM credits can be bought and sold. Though the EU ETS is run by the EU, the CDM and its related Joint Implementation (JI) mechanism is administered by the UN. The four chief benefactors of the CDM in 2013 were China, India, Brazil and Mexico; the largest investor into the system is the UK (United Nations, 2014).

The World Bank examined the CDM, EU ETS and other market-based systems, and found that such carbon pricing instruments can be effective. However, market-based systems do not always work in the manner or to the extent expected. It reported that instruments can be designed to be more cost-effective and flexible; linking can influence market behavior; levers that work for the private sector do not always deliver at government level; and that policy designers need to take systemic overlaps and interactions into account (World Bank, 2014c).

By 2013, 35 countries (including 28 in the EU) and a total of 20 states and provinces had enacted emissions trading programs; together, these cover about 8.5% of global Green House Gases (GHG) emissions (World Bank, 2014c).

2.3 Revenue Distribution from Carbon Levies

Some claim that environmental protection policies are regressive because they raise prices for the lower income classes and eliminate jobs. Slogans such as, “This will raise prices!” and, “Jobs will be lost!” have been popular in TV campaign ads by industries when fighting environmental initiatives. A recent example of such accusations took place when the oil and gas industry spent millions to attack anti-fracking initiatives in Santa Barbara and San Bernardino counties in California (Cart, 2014). Similarly, Australians recently voted a prime minister out of office on the issue of carbon taxation.

Industry opponents played up the word “taxes” pejoratively, and the opposition candidate promised to, “Ax the tax.” The new government promptly got rid of the country’s anti-carbon program, although two-thirds of Australian voters believe there should be a limit on carbon emissions. The California and Australia cases illustrate that voters may be emotionally swayed against carbon limits unless they can see near-term and understandable benefits, especially if powerful interests (oil companies in California and coal companies in Australia) use massive media buys to fight anti-pollution initiatives (Baird, 2014).

Although levies on carbon (whether a straight tax or ETF) can be regressive, there are ways to mitigate impacts. Williams (2014) and Gonzales (2012) found that the major determinant of the distributional effects of a carbon tax across income groups arises from the methods by which that revenue is recycled. For example, voters in California and Germany, where energy taxes are recycled to benefit the populace, have been supportive of carbon reduction initiatives, which have created many new jobs. Similarly, Costa Rica’s revenues from its recently initiated carbon trading program are being used to pay thousands of landowners for

reforestation and green energy projects. They also fund a bank (aptly named BanCO2!) for low-cost financing of energy-efficient cars and home energy retrofits. These are examples of high-visibility benefits that proved popular.

Gonzales (2012) examined other options for spending the proceeds from carbon emissions in Mexico, including a manufacturing tax-cut and food subsidies. He determined that costs are distributed regressively when revenue is recycled as a manufacturing tax and progressively when it is recycled as a food subsidy for the less wealthy. However, studies have shown that providing subsidized foods to poor or rural areas can negatively affect crop prices of local farmers and damage the economy (Oxfam, 2005). Neither of these two policies, thus, appears to be an attractive way to spend carbon revenues, compared to the strategy employed by Costa Rica and others, to stimulate local green initiatives.

Bowen (2011) analyzed different carbon pricing strategies. His policy recommendations included investing in R&D to promote innovation and appropriate infrastructure improvements, and funding for renewable energy projects.

3. Policy Analysis and Options

Mexico is moving ahead on carbon tax initiatives in order to reduce global climate change and its own high level of pollution. Its emissions level in 2010 was about 661 megatons of CO_2e, and its pledged emissions level for 2020 is 672 megatons, which is 30% below Business as Usual (BAU) levels. The current trajectory (unless the planned actions are actually put in place) for 2020 indicates a level of 800-845 $MtCO_2e$, which would substantially increase health costs and deaths from air pollution and other greenhouse gas effects. This is, therefore, a high-priority issue for Mexico. Major portions of its economy and tens of thousands of lives are at risk.

As stated, the strategic objective of Mexico's government is to achieve sustainable development, defined as a condition when climate stabilization policies trigger innovative solutions that drive economic growth and offer social benefits. As a result, the evaluative criteria for climate policy options should include: economic growth (renewable energy investment and job creation), social benefits (better health), and environmental improvement (reaching the desired CO_2 emission level and reducing air pollution). The aforementioned literature indicated three major policy options for Mexico that could achieve these criteria. These are reviewed below, with the assumption that similar conclusions could be drawn for other, though not necessarily all, Latin American countries.

3.1 A Carbon Pricing Option

A carbon tax has many advantages. First, the tax provides immediate revenue for the government, estimated at over $1 billion for Mexico. Second, it can be simple, transparent, and cost efficient. Third, a carbon tax provides an incentive to reduce emissions from present fossil fuel energy sources and encourages the use of more efficient alternatives. Finally, it can be an effective first step to carbon reduction before getting into the full complexities of an ETS.

Disadvantages include the possible decline of industrial competitiveness, uncertain emissions target, and the potential pushback of industry and consumers if they perceive they are being "taxed" only for vague, futuristic goals. The present Mexican implementation of a carbon tax appears to encourage moving to natural gas rather than green energy, since gas is not taxed, and is often cheaper than renewable energy alternatives. An inclusion of natural gas (as is practiced by Norway, Denmark, and others) in the taxation should be considered for the future. Without such an inclusion, Mexico cannot grow with "sustainable" energy, as is the stated goal.

The experience of other countries with a carbon tax, evaluated by the aforementioned criteria, is as follows: a) it is effective for environmental improvement (it reduced air pollution but may not have reached desired CO_2 emission level); b) it creates social benefits (better health); but c) it has little or no impact on economic growth, especially job creation.

3.2 An ETS Option for Mexico

An ETS can help achieve meaningful reductions in greenhouse gas emissions levels, since it is goal-oriented toward a maximum pre-determined emissions level. An ETS can be cost-effective because it recognizes that some companies can be more effective at reducing emissions than others and allows competitive market forces, rather than bureaucracy, to make adjustments while assuring the final goal. An ETS can also generate revenue for the government, although the amount may not be as predictable as income from a pure-form carbon tax.

One ETS disadvantage is that it can encourage industries that are addicted to fossil fuels to pollute more because it is possible to purchase cheap offsets or carbon credits rather than switch from fossil fuels to renewable energy. An ETS is complex to setup and administer, even with initial experience with a carbon tax system. It is also subject to major external shocks such as recessions, which can result in unpredictable carbon pricing and planning difficulties for industry.

For the three criteria, an ETS would a) benefit the environment (by decreasing air pollution, and presumably reach a desirable CO_2 emission level); b) would offer the social benefit of better health, from better air; and c) it has minor effects on economic growth, with negligible job creation.

The experience of other countries with an ETS that reacts purely to prices has been that no new or innovative technology has been produced, and the cheapest off-the-shelf renewable energy systems are usually imported and used. Without government support, the advancement of sustainable energy in Mexico with this option is liable to be limited, especially in rapidly evolving green technologies, such as renewable energy (RE) storage, micro-grids, RE linked to water purification or desalination, and non-opaque solar cells.

3.3 An ETS with Revenues Dedicated to Clean Energy

The benefits of an ETS, as well as its challenges, were aforementioned. If Mexico evolved from its carbon tax system to an ETS and earmarked the resultant revenues for true green energy (not natural gas) projects, that could provide many potential opportunities. This is the only option that meets all three criteria. It a) supports environmental improvement (both by reducing CO_2 to the desired level and air pollution); b) offers social benefits, including better health; and c) supports significant economic growth, including creating jobs by providing the tax revenues for green energy projects, including innovative research for pollution reduction via carbon storage or water purification systems. R&D funding of RE projects could advance the goal of making Mexico's economic growth sustainable.

Such funding could be greatly leveraged by not having the government pay the entire bill, but by forming Public Private Partnerships (P3) with industry. Experience has shown that leverage of 10:1 for green energy projects is possible with this schema; that is, the provision of $1 million by government for a project could attract $10 million from private industry (Cellucci & Grove, 2011). Energy is an especially good candidate for this, as RE is often marginally 10% more expensive than fossil fuel competitors. With the P3 support from government making up the difference, industry could be assured of successful competition for projects.

In short, Option 3 appears to have the greatest payoff for Mexico, and the best chance of helping it meet its goals for increasing economic growth sustainably, obtaining social benefits and reducing pollution both within the country and on a global basis.

4. Conclusion

Air pollution is a serious threat to the health and economic development of Latin America. Over 100 million people are breathing dangerously polluted air; over 14,700 deaths were caused by air pollution in Mexico alone in 2010 (Maxwell, 2013). The new government of Mexico, under President Nieto, has pledged to accelerate the drive to cut pollution, increase clean energy use, and reduce emissions by 30% by 2020 (Leme, 2014). To reach this goal, the Mexican government has implemented a carbon tax and is examining a market-based ETS. A carbon tax has been shown to be effective—if it is carefully managed and does not hurt the competitiveness of local industries (EU, 2013).

An even better energy policy option appears to be a transition to an ETS, with resultant revenues dedicated to developing green projects in Mexico, including innovative R&D to reduce pollution and produce clean energy on a continuous basis. The funding's effect could be multiplied by creating a P3 for R&D, critical to the nation and profitable for the investors.

If Mexico follows through on its announced initiatives, it could provide a model for other Latin American countries, which have made progress in some, but not all, of these areas. Brazil has expanded its clean energy, to 15% of its total consumption. Chile plans to increase RE to 20% of its total by 2020. Uruguay is starting major solar and wind projects. However, none of the other Latin countries appears to be as advanced as Mexico, with its comprehensive ambitions for pollution reduction and renewables support. It could, thus, serve as a model for success, if its leadership follows up on its promises. Vig et al. (1999) remind us that environmental policy develops under leadership rather than by public opinion. Mexico is showing Latin America and the world that it is becoming a leader in the post-carbon economy.

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